

Date: Sun, 22 Aug 93 04:30:12 PDT
From: Ham-Ant Mailing List and Newsgroup <ham-ant@ucsd.edu>
Errors-To: Ham-Ant-Errors@UCSD.Edu
Reply-To: Ham-Ant@UCSD.Edu
Precedence: Bulk
Subject: Ham-Ant Digest V93 #21
To: Ham-Ant

Ham-Ant Digest Sun, 22 Aug 93 Volume 93 : Issue 21

Today's Topics:

 a question on antenna constraints (3 msgs)
 Comments on the MFJ 1796 Halfwave Vertical. (2 msgs)
 How to use dip oscillator on an antenna?
Is there such thing as an omnidirectional antenna in 3 dimensions?
 Synthetic Apertures (was: Some Fundamental Antenna Questions)

Send Replies or notes for publication to: <Ham-Ant@UCSD.Edu>
Send subscription requests to: <Ham-Ant-REQUEST@UCSD.Edu>
Problems you can't solve otherwise to brian@ucsd.edu.

Archives of past issues of the Ham-Ant Digest are available
(by FTP only) from UCSD.Edu in directory "mailarchives/ham-ant".

We trust that readers are intelligent enough to realize that all text
herein consists of personal comments and does not represent the official
policies or positions of any party. Your mileage may vary. So there.

Date: Fri, 20 Aug 1993 17:58:19 GMT
From: pravda.sdsc.edu!news.cerf.net!usc!howland.reston.ans.net!xlink.net!
scsing.switch.ch!aristo.tau.ac.il!zvikal@network.ucsd.edu
Subject: a question on antenna constraints
To: ham-ant@ucsd.edu

As a mere physicist with no deep understanding of either antennae nor
radio communications, I still want to ask the following question:
I have recently been told by a friend that in antenna design, there
is always a tradeoff between gain and the angle range of reception.
While for a specific size of antenna I can see this is logical, my friend
went further to claim that this is true for all sizes - i.e. that you
cannot make an antenna with twice the gain and the same angle range as
one you already have. this seems to me contradictory to physical common
sense. At least in cases where the wavelength is much smaller than the
linear dimension of the antenna, don't optical laws apply? I mean,
in optics there is no such constraint - you can make any combination
of 'gain' (light magnification) and angle range (Field Of View) you want

to, as long as you are willing to pay for the final size of the thing.
I can be reached at
zvikal@ccsg.tau.ac.il

Zvi Lev

Date: Sat, 21 Aug 1993 01:06:07 GMT
From: dog.ee.lbl.gov!overload.lbl.gov!agate!spool.mu.edu!sdd.hp.com!col.hp.com!
news.dtc.hp.com!srigenprp!alanb@network.ucsd.edu
Subject: a question on antenna constraints
To: ham-ant@ucsd.edu

Zvi Lev (zvikal@ccsg.tau.ac.il) wrote:
: I have recently been told by a friend that in antenna design, there
: is always a tradeoff between gain and the angle range of reception.
: While for a specific size of antenna I can see this is logical, my friend
: went further to claim that this is true for all sizes - i.e. that you
: cannot make an antenna with twice the gain and the same angle range as
: one you already have. this seems to me contradictory to physical common
: sense.

Your friend is right. Let's assume 100% efficient antennas (a reasonable approximation in most cases.) Antenna gain is obtained by reducing radiation in undesired directions and re-directing the power in the desired direction. If you integrate the power density over the entire sphere (with the antenna at the center), you will get 100% of the power going into the antenna. It seems fairly intuitive to me that the narrower the beam width, the more gain.

: At least in cases where the wavelength is much smaller than the
: linear dimension of the antenna, don't optical laws apply? I mean,
: in optics there is no such constraint - you can make any combination
: of 'gain' (light magnification) and angle range (Field Of View) you want
: to, as long as you are willing to pay for the final size of the thing.

It works the same at optical wavelengths. The most common way to get "gain" with light is with a reflector. The bigger the reflector, the less spreading of the beam and the more intense the light (at long distances).

AL N1AL

Date: Sun, 22 Aug 1993 06:38:35 GMT
From: usc!howland.reston.ans.net!gatech!kd4nc!ke4zv!gary@network.ucsd.edu

Subject: a question on antenna constraints
To: ham-ant@ucsd.edu

In article <CC34E8.M47@srigenprp.sr.hp.com> alanb@sr.hp.com (Alan Bloom) writes:

>Zvi Lev (zvikal@ccsg.tau.ac.il) wrote:

>: I have recently been told by a friend that in antenna design, there
>: is always a tradeoff between gain and the angle range of reception.
>: While for a specific size of antenna I can see this is logical, my friend
>: went further to claim that this is true for all sizes - i.e. that you
>: cannot make an antenna with twice the gain and the same angle range as
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>: sense.

>

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>sphere (with the antenna at the center), you will get 100% of the power
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>narrower the beam width, the more gain.

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>: linear dimension of the antenna, don't optical laws apply? I mean,
>: in optics there is no such constraint - you can make any combination
>: of 'gain' (light magnification) and angle range (Field Of View) you want
>: to, as long as you are willing to pay for the final size of the thing.

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>"gain" with light is with a reflector. The bigger the reflector, the
>less spreading of the beam and the more intense the light (at long
>distances).

You're looking at a transmit antenna while Zvi is thinking of a receive antenna. While it's obvious that beamwidth and gain are associated for transmission, it's not so obvious in the receive case, even though it's generally true. It's intuitively obvious that a larger antenna will receive more of a passing wavefront's energy than a small one, (to keep this away from previous discussions assume the antenna is many wavelengths in physical size). What isn't quite as obvious is that such a large antenna is also very directional, sometimes in several directions, due to major and minor lobes. This is because of the constructive and destructive interference patterns set up by *combining* the many "elements" formed by the wire. The reason this isn't immediately obvious in the optical case is that the light sources generally are *incoherent* and the signal is built up by integrating the signal over time. If you used a laser, and combined the energy from various parts of the "antenna" in phase, IE in the optical case *focused*, the situation would be the same at optical frequencies. With incoherent

signals, the amount of energy received *is* directly proportional to the area of the receiver. For example, a flat plate solar collector captures as much energy as a dish of the same size, but is not nearly as directional. Note that peak *temperature* may be higher at the dish focus, but the energy captured remains strictly proportional to the area of the collector.

A classic radio example of this is being discussed over on misc. That's the case of a space diversity receiving system. The RF energy's phase information is being kept separated while the modulation energy is summed. This breaks the phase coherence problem of the antenna elements while maintaining reinforcement for the desired modulation components. Another example more directly related to receive power is the rectenna where many elements are combined *at DC* to form a much stronger signal while maintaining the directional characteristics of a flat plate.

Gary

--

Gary Coffman KE4ZV	"If 10% is good enough	gatech!wa4mei!ke4zv!gary
Destructive Testing Systems	for Jesus, it's good	uunet!rsiatl!ke4zv!gary
534 Shannon Way	enough for Uncle Sam."	emory!kd4nc!ke4zv!gary
Lawrenceville, GA 30244	-Ray Stevens	

Date: Fri, 20 Aug 1993 23:50:53 GMT
From: elroy.jpl.nasa.gov!sdd.hp.com!col.hp.com!news.dtc.hp.com!hpscit.sc.hp.com!
icon.rose.hp.com!greg@ames.arpa
Subject: Comments on the MFJ 1796 Halfwave Vertical.
To: ham-ant@ucsd.edu

Russell P. Starksen (rps@cray.com) wrote:
: Has anyone tried the MFJ Halfwave vertical antenna?
:

Aww, come on. *SOMEBODY* must have tried this thing by now. Or is everybody waiting for a real report before going out to buy one (like me :-)?

Greg. KD6KGW

Date: 21 Aug 1993 00:50:11 GMT
From: dog.ee.lbl.gov!overload.lbl.gov!agate!howland.reston.ans.net!gatech!concert!
lester.appstate.edu!usenet@network.ucsd.edu
Subject: Comments on the MFJ 1796 Halfwave Vertical.

To: ham-ant@ucsd.edu

In <CC30wt.IqG@icon.rose.hp.com> greg@core.rose.hp.com writes:

> Russell P. Starksen (rps@cray.com) wrote:
> : Has anyone tried the MFJ Halfwave vertical antenna?
> :
>
> Aww, come on. *SOMEBODY* must have tried this thing by now. Or is everybody
> waiting for a real report before going out to buy one (like me :-)?
>

I have checked with ten different dealers and only one had ever gotten one of the antennas which allegedly have been backordered for close to six months.

When I posted a similar inquiry about the 1796 about three months ago, I got one response after about six weeks from someone who had finally gotten one. Are there, in fact, very many in use?

Marv Hoffman, KD4EGV
Boone, NC

Date: 21 Aug 93 17:48:21 GMT
From: ogicse!uwm.edu!cs.utexas.edu!swrinde!dptspd!news@network.ucsd.edu
Subject: How to use dip oscillator on an antenna?
To: ham-ant@ucsd.edu

In article <1993Aug18.153200.20596@nnntpd2.cxo.dec.com> little@nuts2u.enet.dec.com (nuts2u::little) writes:

>algot@stein.u.washington.edu () writes:

>
>> Does anyone out there have any experience using a dip oscillator on
>>antennas? I'm finding that unless the antenna has a lumped inductance to
>>couple into I have no luck getting a dip. I've followed Moxon's advice
>>in _HF Antennas for all Locations_ and made a big (12") triangular loop
>>with two turns, but I'm still not having much luck. Any suggestions?
>>Capacitive coupling? A BIGGER loop? Does listening for a dip with audio
>>modulation really help that much (my dipper is homebrew -- it wouldn't
>>take much to add 1000 Hz square wave modulation)? Tips, hints, sea stories
>>all welcome... does anyone even use dippers anymore?

>
>I attach the feedpoint of the antenna to a small coil of perhaps 3 or 4
>turns that is large enough to insert the coil from the dip meter. This
>inductive coupling seems to work fine for me.

>

>73,
>Todd
>N9MWB

Another tip -- for what it's worth. If you try to dip the antenna from the other end of the feedline, your dip meter will show false responses due to the feedline itself (you'll see dips at odd multiples of the half-wave freq). If you terminate the feedline at the antenna with a resistor equal to the line Z, those false dips should disappear & you should only see dips due to the antenna resonances.

Hope that helps.

KB5PS
jdb@sat.datapoint.com

Date: 18 Aug 1993 06:02:06 GMT
From: munnari.oz.au!spool.mu.edu!howland.reston.ans.net!europa.eng.gtefsd.com!
mozart.amil.jhu.edu!ishtar.med.jhu.edu!roberts@network.ucsd.edu
Subject: Is there such thing as an omnidirectional antenna in 3 dimensions?
To: ham-ant@ucsd.edu

[I originally posted this to sci.electronics, but I thought that the device that I'm looking for might be something that is in common use by amateurs and broadcasters. Sorry if it doesn't seem relevant. dcr]

Hi all,

I'm looking for an antenna of some sort that I can use as an omnidirectional field strength indicator. We have a system that produces 3 orthogonal (at 90 degrees to one another) magnetic fields at 3 frequencies. The 'emitters' are mounted on a 40 inch cubical frame, so that at the center of the cube, you get 3 fields that are approximately orthogonal to each other. We use it to measure the gaze direction of the eyeball by placing a small coil of wire embedded in a contact lens onto the eye. A wire is run from the eyecoil to an amplifier which separates the 3 frequencies and gives us the strength of each of the fields as picked up by the (very directional) coil of wire. To get our math right, we need to detect the relative strength of the 3 fields very near the eyecoil.

Date: Sat, 7 Aug 1993 18:29:28 GMT
From: gate.ready.com!taurus.cs.nps.navy.mil!rovero@decwrl.dec.com

Subject: Synthetic Apertures (was: Some Fundamental Antenna Questions)
To: ham-ant@ucsd.edu

Synthetic Aperture is actually pretty simple. Just move the antenna. That's how the air/space craft SARs work.

Not too practical for communications work, though.

SAR works on the principle of collecting N returns from an object by hitting it N times from N different positions.

--

Josh Rovero (rovero@oc.nps.navy.mil) | Packet: KK1D @ K6LY
Department of Oceanography, Code OC/Rv |
Naval Postgraduate School |
Monterey, CA 93943 (408) 656-2084 |

Date: (null)
From: (null)
Thanks in advance,
dale, roberts@ishtar.med.jhu.edu

Date: Sun, 22 Aug 1993 03:14:42 GMT
From: usc!howland.reston.ans.net!usenet.ins.cwru.edu!nshore!seastar!
vikki@network.ucsd.edu
To: ham-ant@ucsd.edu

References <1993Aug20.091116.71398@cc.usu.edu>,
<1993Aug20.175346.23405@kodak.rdc.kodak.com>, <CC3952.7x2@feenix.metronet.com>
Reply-To : vikki@seastar.org(Victoria Welch)
Subject : Re: Best portable antenna???

As quoted from <CC3952.7x2@feenix.metronet.com> by marchbg@feenix.metronet.com
(Marc Grant):

> What, in the humble opinion, is the best portable long-wire type antenna
> design? Don't say an AEA Isolooop or R5 verticle. I'm looking for
> something I can easily pack in a suitcase with my clothes when I go to Europe.

The recommendation I have heard that seemed to meet with general approval is a spool of magnet wire and a small tuner. Lots of flexibility !

I sure wouldn't tell you an isolooop - a friend (? :) who was sick and

tired and fed up with the one he had gave us his. After 5 hours this evening of working with it have found it less than useful. So far we have had to take it apart and get the gears to mesh as to have not too much backlash and slow the tuner box so that it would single-step the stepper motor so that we could get down to about 1 3:1 swr (best we have done so far). Pathetic. Even worse at \$329 the guy paid for it. Comparing it to to wire we have running around the ceiling here, its still a loser. BTW: our friend lives in an apartment also has never had this antenna outside and its less than a year old, not like its been abused. We have had this thing out in the clear on a pole on the balcony for these tests - you'll do *much better* with a roll of magnet wire and a tuner.

Good Luck, I hope this helps !

--

Vikki Welch, SysAdmin Welch Research, WV9K, DoD#-13
vikki@seastar.org, vikki@wv9k.atl.ga.us(weekly)

Date: Sat, 21 Aug 1993 02:48:38 GMT
From: dog.ee.lbl.gov!overload.lbl.gov!agate!howland.reston.ans.net!math.ohio-state.edu!uwm.edu!msuinfo!uchinews!spssig.spss.com!feenix.metronet.com!
marchbg@network.ucsd.edu
To: ham-ant@ucsd.edu

References <1993Aug18.172421.15502@cs.rochester.edu>,
<1993Aug20.091116.71398@cc.usu.edu>,
<1993Aug20.175346.23405@kodak.rdc.kodak.com>sps
Subject : Best portable antenna???

What, in the humble opinion, is the best portable long-wire type antenna design? Don't say an AEA Isolloop or R5 verticle. I'm looking for something I can easily pack in a suitcase with my clothes when I go to Europe.

THanks in advance!

--

Marc B. Grant, N5MEI | marchbg@feenix.metronet.com | 214/231-3998 (voice)
P.O Box 850472 | marchbg@esy.com | 214/231-0025 (fax)
Richardson, TX 75085 |

End of Ham-Ant Digest V93 #21
